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ABSTRACT

Holt, Rinehart and Winston (School Department) sought to investigate the curriculum area of mathematics (kindergarten through grade eight) and in particular the content and design of the Holt School Mathematics (HSM) program. For those purposes, a questionnaire was designed to assess judgments on topics such as trends in mathematics curriculum and textbook features. Results include: a reported increase in curriculum emphasis for basic skills, metric system, use of the mini-calculator, estimation skills, readiness activities, problem solving, use of manipulative materials, drill, decimal computation, percents, and student projects, a reported decrease in emphasis on sets and numeration systems other than base ten. (MP)

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The HOLT SCHOOL MATHEMATICS © 1974 Program and Trends in the Elementary Mathematics Curriculum (June, 1977)

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and

Trends in the Elementary Mathematics Curriculum

(June, 1977)

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I. Statement of Purpose/Objectives:

Holt, Rinehart and Winston (School Department) sought to investigate the curriculum area of mathematics (kindergarten through grade eight) and in particular the content and design of the HOLT SCHOOL MATHEMATICS (HSM) program. For those purposes, a questionnaire was designed which would meet the following objectives:

A. To assess the characteristics of the population sample completing the questionnaire.

B. To assess judgments from educators as to the trends in the mathematics curriculum of five years hence.

C. To assess judgments from educators to general statements concerning the mathematics curriculum.

D. To assess judgments from educators as to features which are considered important in selecting a mathematics series.

E. To assess judgments from educators employing the HSM program concerning the instructional design and content of the program.

II. Methodology:

The questionnaire was distributed nationwide to both users and non-users of the HSM program at the K-6, K-8, K-12, 7-8, and 7-9 grade levels. Sampling ratios were established in accordance with national statistics data provided by the *National Center for Education Statistics 1976 Report* (U.S. Government Printing Office, Washington, D.C.: 1977). Moreover, the questionnaire was distributed to district level elementary mathematics administrators.

A *main* questionnaire was developed which included items which met objectives A-D for school administrators and teachers who were categorized as either Holt users or non-users[1], and which met objectives B-D for district level mathematics administrators. An addendum to the main questionnaire was developed which included items which met objective E for school administrators and teachers who were Holt users.

[1] In the present study, "Holt" respondents will refer to respondents who are employing the HSM program, "Non-Holt" respondents will refer to respondents who are employing a mathematics program other than HSM.

The moderator variable of "instructor's grade assignment" further differentiated classroom teachers as primary teachers (Grades K-2), intermediate teachers (Grades 3-6), and junior high school teachers (Grades 7-8).

In data processing, rating scale items on the questionnaire were statistically analyzed by assessing for each item: frequency, percentage, mean and standard deviation. In addition, a One-Way Analysis of Variance and the Scheffé Test for All Possible Comparisons were utilized on rating scale items to assess statistically significant differences in judgment among the sample populations ($p < .05$)[2].

For questionnaire items which required the pooling of a teacher sample (e.g. considering all Holt teachers as a total), the total sample was weighted in accordance with national statistics data for instructor's grade assignment in the following manner: K-2 teachers—31%, 3-6 teachers—44%, and 7-8 teachers—25%.[3]

III. Results:

There were 2,487 Holt user respondents to the questionnaire (514 school administrators, 1,973 teachers), 4,124 non-Holt respondents (936 school administrators, 3,188 teachers) and 307 district level math administrators.

A. School Information.

The respondents (both Holt and non-Holt) are thus represented by national geographic region[4]: Midwestern Region (29%), Eastern Region (21%), Western Region (19%), Atlantic Region (18%) and Pacific Region (13%). In rank order they describe their school community as a small city or town (39%), a suburb of a large city (24%), a rural area (20%) or a large city (16%). Typically, their schools include the grades of kindergarten through six and enroll a school population of 301-500 students.

B. Class Information.

Of the 1,973 Holt teachers, 510 teachers teach at the primary level (Grades K-2), 1,120 teach at the intermediate level (Grades 3-6), and 343 teach at the junior high school level (Grades 7-8). Similarly, of the 3,188 non-Holt teachers, 838 teachers teach at the primary level (Grades K-2), 1,765 teach at the intermediate level (Grades 3-6), and 585 teach at the junior high level (Grades 7-8). The number of years that the respondents report teaching at their current grade level varies little between

[2] Level of significance.

[3] The procedure of weighting was utilized in the present study so that better comparisons between the judgments of *total* teacher categories could be made. Such weighting assured that the input of the instructor's grade assignment category (i.e. K-2, 3-6, 7-8) remained constant in all teacher totals.

[4] In this study, the *Eastern Region* included the states of Connecticut, Delaware, Maryland, Maine, Vermont, New Hampshire, Massachusetts, New Jersey, New York, Rhode Island, and Pennsylvania. The *Atlantic Region* included the states of Alabama, Florida, Georgia, South Carolina, Virginia, West Virginia, Kentucky, North Carolina, and Tennessee. The *Midwestern Region* included the states of Minnesota, Wisconsin, Michigan, Indiana, Illinois, North Dakota, Ohio, and South Dakota. The *Western Region* included the states of Nebraska, Kansas, Iowa, Colorado, Wyoming, Missouri, New Mexico, Arkansas, Louisiana, Mississippi, Oklahoma, and Texas. The *Pacific Region* included the states of Washington, Idaho, Oregon, Montana, Utah, Arizona, Hawaii, Nevada, California and Alaska.

total Holt and non-Holt teachers (Holt teachers, $\overline{X}$=8.31 years, non-Holt teachers, $\overline{X}$=8.19 years). Both Holt and non-Holt teachers commonly spend 201 to 250 minutes per week on mathematics instruction and group students for mathematic instruction as a whole class (regardless of grade category). Moreover, both Holt and non-Holt teachers report that their students are on grade level, although this percentage, decreases as the instructor's grade level increases. In addition, it should be noted that the percentage of teachers who report that their students are on grade level in mathematics (Holt teachers-73.0%, non-Holt teachers-72.6%) varies considerably from the percentage report of school administrators (Holt administrators-58.9%, non-Holt administrators-58 .1%).

C. Trends in Mathematics Education.

All respondents were asked to judge the emphasis that specific trends would receive in the mathematics curriculum of five years hence. For these questionnaire items, the respondents were asked to rate the emphasis that each trend would receive on a scale of 5 (Much Stronger) to 1 (Much Weaker). In addition, a One-Way Analysis of Variance and Scheffé procedure were conducted to compare respondent groups (district level math administrators, Holt school administrators, non-Holt school administrators, "weighted" Holt teachers, and "weighted" non-Holt teachers) for significant differences ($p < .05$) in their judgments. (Please refer to TABLE I for the analysis summary on pages 4 to 7.)

In general, school administrators and teachers report that the following trends in the mathematics curriculum will be *maintained* at their current 1976-1977 level: computation with large numbers, number properties, probability, geometry, related sentences, inequalities, expanded notation, scientific notation, and fractions. It should be noted, however, that the variance of the responses of junior high school teachers for the trend—"fractions" is quite large (Holt 7-8 teachers: S^5=1.02, non-Holt 7-8 teachers: S=1.03) indicating strongly differing judgments within this teacher group.

School administrators and teachers report that the following trends in the mathematics curriculum will move in the direction of *increasing* their emphasis in the next five years: basic skills, metric system, use of the mini-calculator, estimation skills, readiness activities, problem solving, use of manipulative materials, drill, decimal computation, percents, and student projects. Although the rating scale means of school administrators and teachers indicate an increase in the use of the mini-calculator in future mathematics instruction, the variance of their responses is large (standard deviation range=.88-1.03).

School administrators and teachers report that the following trends in the mathematics curriculum will move in the direction of *decreasing* their empasis in the next five years: sets and numeration systems other than base ten.

The One-Way Analysis of Variance and Scheffé Procedure Summary compare the responses of the respondent groups (math administrator, Holt school administrator, non-Holt school administrator, "weighted" Holt teachers, and "weighted" non-Holt teachers). In general, the judgments of all administrators and teachers are not significantly different from each other in regard to trends in the mathematics curriculum of five years hence. This conclusion can be recognized from the summary

[5] S=Standard Deviation

TABLE Ia.

One-Way Analysis of Variance and
Scheffé Procedure Summary for:

The Curriculum Area of Mathematics
(Trends in Math Education)

Q. How much emphasis do you feel each of the following trends will receive in the mathematics curriculum of *five years hence* as compared to its present emphasis? (Scale Values: 5=Much Stronger, 3=Maintained at '76-'77 level, 1=Much Weaker).

Emphasis on:	*	Group 1 Math Adm.	Group 2 Holt School Adm.	Group 3 Non-Holt School Adm.	Group 4 Wtd. Holt Tchrs.	Group 5 Wtd. Non-Holt Tchrs.	Multiple Comparison Conclusion** Subset 1	Subset 2	Subset 3
SETS	M	2.58	2.69	2.68	2.71	2.69	Grp. 1 Grp. 2 Grp. 3 Grp. 4 Grp. 5		
	S	.70	.68	.73	.76	.81			
BASIC SKILLS	M	3.84	4.51	4.48	4.49	4.48	Grp. 1	Grp. 2 Grp. 3 Grp. 4 Grp. 5	
	S	.83	.66	.68	.67	.69			
METRIC SYSTEM	M	4.12	4.46	4.46	4.49	4.50	Grp. 1	Grp. 2 Grp. 3 Grp. 4 Grp. 5	
	S	.87	.70	.70	.71	.70			

*M=Mean; S=Standard Deviation

**Respondent groups *within* the same subset are homogeneous in their response to a questionnaire item ($p > .05$).
Respondent groups *between* subsets significantly differ in their response to a questionnaire item ($p < .05$).

TABLE Ib.

(Continued)

Emphasis on:	*	Group 1 Math Adm.	Group 2 Holt School Adm.	Group 3 Non-Holt School Adm.	Group 4 Wtd. Holt Tchrs.	Group 5 Wtd. Non-Holt Tchrs.	Multiple Comparison Conclusion** Subset 1	Subset 2	Subset 3
USE OF MINI-CALCULATORS	M	3.81	3.66	3.60	3.56	3.52	Grp. 3	Grp. 2	Grp. 1
	S	.78	.87	.90	.98	1.00	Grp. 4	Grp. 3	Grp. 2
							Grp. 5	Grp. 4	
COMPUTATION WITH LARGE NUMBERS	M	3.04	3.31	3.36	3.37	3.37	Grp. 1	Grp. 2	
	S	.71	.66	.71	.75	.75		Grp. 3	
								Grp. 4	
								Grp. 5	
ESTIMATION SKILLS	M	3.81	3.48	3.52	3.40	3.45	Grp. 2	Grp. 2	Grp. 1
	S	.80	.69	.71	.76	.79	Grp. 4	Grp. 3	
							Grp. 5	Grp. 5	
NUMERATION SYSTEMS OTHER THAN BASE TEN	M	2.33	2.60	2.61	2.63	2.60	Grp. 1	Grp. 2	
	S	.80	.82	.88	.91	.91		Grp. 3	
								Grp. 4	
NUMBER PROPERTIES	M	3.07	3.12	3.13	3.11	3.11	Grp. 1		
	S	.52	.66	.63	.67	.67	Grp. 2		
							Grp. 3		
							Grp. 4		
							Grp. 5		
READINESS ACTIVITIES	M	3.51	3.72	3.68	3.63	3.65	Grp. 1	Grp. 2	
	S	.73	.73	.73	.78	.77	Grp. 4	Grp. 3	
								Grp. 4	
								Grp. 5	
PROBABILITY	M	3.35	3.22	3.17	3.13	3.13	Grp. 2	Grp. 1	
							Grp. 3	Grp. 2	
	S	.65	.68	.70	.70	.73	Grp. 4		
							Grp. 5		

TABLE Ic.

(Continued)

Emphasis on:	*	Group 1 Math Adm.	Group 2 Holt School Adm.	Group 3 Non-Holt School Adm.	Group 4 Wtd. Holt Tchrs.	Group 5 Wtd. Non-Holt Tchrs.	Multiple Comparison Conclusion** Subset 1	Subset 2	Subset 3
STATISTICS	M	3.40	3.21	3.17	3.20	3.19	Grp. 2 Grp. 3 Grp. 4 Grp. 5	Grp. 1	
	S	.64	.70	.74	.74	.77			
PROBLEM SOLVING	M	3.86	4.08	4.05	4.08	4.09	Grp. 1	Grp. 2 Grp. 3 Grp. 4 Grp. 5	
	S	.81	.72	.70	.71	.75			
GEOMETRY	M	3.18	3.21	3.21	3.26	3.27	Grp. 1 Grp. 2 Grp. 3 Grp. 4 Grp. 5		
	S	.55	.62	.64	.67	.70			
USE OF MANIPULATIVE MATERIALS	M	3.54	3.66	3.64	3.67	3.69	Grp. 1 Grp. 2 Grp. 3 Grp. 4	Grp. 2 Grp. 3 Grp. 4 Grp. 5	
	S	.76	.76	.77	.83	.83			
RELATED SENTENCES	M	3.13	3.32	3.32	3.32	3.33		Grp. 2 Grp. 3 Grp. 4 Grp. 5	
	S	.51	.63	.65	.73	.71	Grp. 1		
INEQUALITIES	M	3.02	3.10	3.09	3.11	3.14	Grp. 1 Grp. 2 Grp. 3 Grp. 4	Grp. 2 Grp. 3 Grp. 4 Grp. 5	
	S	.45	.55	.59	.61	.64			
DRILL	M	3.56	4.10	4.10	4.15	4.16	Grp. 1	Grp. 2 Grp. 3 Grp. 4 Grp. 5	
	S	.77	.76	.77	.81	.84			

TABLE Id.

(Continued)

Emphasis on:	*	Group 1 Math Adm.	Group 2 Holt School Adm.	Group 3 Non-Holt School Adm.	Group 4 Wtd. Holt Tchrs.	Group 5 Wtd. Non-Holt Tchrs.	Multiple Comparison Conclusion** Subset 1	Subset 2	Subset 3
EXPANDED NOTATION	M	2.89	2.97	2.99	2.94	2.96	Grp. 1 Grp. 2 Grp. 3 Grp. 4 Grp. 5		
	S	.61	.65	.69	.78	.76			
SCIENTIFIC NOTATION	M	3.13	3.10	3.09	3.07	3.08	Grp. 1 Grp. 2 Grp. 3 Grp. 4 Grp. 5		
	S	.60	.68	.72	.78	.78			
DECIMAL COMPUTATION	M	3.76	3.66	3.70	3.60	3.67	Grp. 1 Grp. 2 Grp. 3 Grp. 4 Grp. 5		
	S	.81	.75	.75	.84	.84			
FRACTIONS	M	2.83	3.42	3.45	3.32	3.36	Grp. 1	Grp. 2 Grp. 4 Grp. 5	Grp. 2 Grp. 3 Grp. 5
	S	.73	.86	.84	.84	.88			
PERCENTS	M	3.36	3.62	3.64	3.51	3.55	Grp. 1	Grp. 2 Grp. 4 Grp. 5	Grp. 2 Grp. 3
	S	.62	.75	.70	.79	.81			
STUDENT PROJECTS	M	3.28	3.41	3.44	3.47	3.51	Grp. 1 Grp. 2 Grp. 3	Grp. 2 Grp. 3 Grp. 4 Grp. 5	
	S	.65	.77	.78	.82	.82			

chart in that school administrator and teacher groups often appear within the same multiple comparison subset, indicating homogeneity in their responses to specific trends. In contrast, the district level math administrators often significantly differ ($p < .05$) from school administrators and teachers in their judgments concerning trends. This conclusion can be recognized from the summary chart in that district level math administrators often appear as a single group within a multiple comparison subset.

D. Most Important Features in Selecting a Math Series and General Mathematics Curriculum Statements.

The respondents were asked to rank the three most important features in selecting a math series. All respondent groups most frequently selected "Stress on Basic Skills" as the most important feature. The following table presents in rank order the three most frequently selected features as reported by the respondent groups.

TABLE II.

MOST IMPORTANT FEATURES IN SELECTING A MATH SERIES

Rank Order Selection	Math Adm.	Holt School Adm.	Non-Holt School Adm.	Wtd. Holt Tchrs.	Wtd. Non-Holt Tchrs.
1.	A	A	A	A	A
2.	C	A/C*	A/C	B	B
3.	C/D	C/D	C/B	B/C	C

Code:
A=Stress on Basic Skills
B=Practice Exercises
C=Practical Applications
D=Provision for Different Ability Levels

*Each feature on a shared selection received the common rank.

The respondents were asked to rate how strongly they agreed or disagreed with general mathematics curriculum statements on a scale of 5 (Strongly Agree) to 1 (Strongly Disagree). In addition, a One-Way Analysis of Variance and Scheffé Procedure were conducted to compare respondent groups (math administrators, Holt school administrators, non-Holt school administrators, "weighted" Holt teachers, and "weighted" non-Holt teachers) for significant differences ($p < .05$) in their judgments. (Please refer to TABLE III for the analysis summary on pages 10 to 12.)

In general, all respondents report agreement with the following statements:

1. Extra practice examples at the end of a text is a valuable aid in a math program.

2. In preparation for decimal skills, stress should be given to fractions with the denominator of ten.

3. Teaching the relation of operations (e.g. subtraction is the inverse of addition) is an important objective of any math program.

4. Maintenance of skills should be provided for at the end of each textbook lesson.

5. Place value is an important concept in math instruction.

6. Exercises should be differentiated into blocks according to student ability.

7. Children should gain equal facility in horizontal and vertical notation.

8. The four operations should be taught in separate chapters.

9. Grouping to tens helps primary children learn basic facts with sums greater than ten.

10. Teaching missing addends is an important part of a primary math program.

It should be noted that the variance of the responses for statements "7" through "10" are very large, indicating strongly differing judgments within respondent groups.

The respondents report that they are undecided in regard to the statement: The "function machine" is a valuable tool in aiding comprehension of math concepts. Their responses tend to move in the direction of disagreement to the statement: Instruction in using a mini-calculator should be included as a regular aspect of a pupil text. The variance of the responses for this statement, however, are very large (Standard Deviation range=1.08–1.24) indicating, once again, strongly differing judgments within respondent groups.

The One-Way Analysis of Variance and Scheffé Procedure Summary compare the responses of the respondent groups (math administrator, Holt school administrator, non-Holt administrator, "weighted" Holt teachers, and "weighted" non-Holt teachers). In general, the judgments of Holt teachers and non-Holt teachers are not significantly different ($p < .05$) from each other in regard to agreement with the general mathematics curriculum statements. Moreover, the judgments of the Holt school administrators and non-Holt school administrators are not significantly different from each other in regard to agreement with the general mathematics curriculum statements. There are, however, many significant differences between the judgments of teachers (total) and school administrators (total). This conclusion can be recognized from the summary chart in that school administrator groups (Holt and non-Holt) often appear within the same subset, but teacher groups (Holt and non-Holt) appear within another subset. District level math administrators continue their pattern of often significantly differing in their judgments from both school administrators and teachers.

TABLE IIIa.

One-Way Analysis of Variance
Scheffé Procedure for:

The Curriculum Area of Mathematics
(Instructional Design and Content of
Published Series in Mathematics)

Q. How strongly do you agree or disagree with each of the following statements? (Scale Values: 5-Strongly Agree, 4=Agree, 3-Undecided, 2=Disagree, 1=Strongly Disagree.)

Statement	*	Group 1 Math Adm.	Group 2 Holt School Adm.	Group 3 Non-Holt School Adm.	Group 4 Wtd. Holt Tchrs.	Group 5 Wtd. Non-Holt Tchrs.	Multiple Comparison Conclusion** Subset 1	Subset 2	Subset 3
INSTRUCTION IN USING A MINI-CALCULATOR SHOULD BE INCLUDED AS A REGULAR ASPECT OF A PUPIL TEXT	M	3.53	3.03	3.09	2.72	2.78	Grp. 4	Grp. 2	Grp. 1
	S	1.14	1.10	1.11	1.15	1.17	Grp. 5	Grp. 3	
EXTRA PRACTICE EXAMPLES AT THE END OF A TEXT ARE A VALUABLE AID IN A MATH PROGRAM	M	4.24	4.32	4.34	4.56	4.56	Grp. 1 Grp. 2	Grp. 4	
	S	.81	.67	.70	.62	.66	Grp. 3	Grp. 5	
EXERCISES SHOULD BE DIFFERENTIATED INTO BLOCKS ACCORDING TO STUDENT ABILITY	M	4.17	4.08	4.10	3.93	4.08	Grp. 4	Grp. 1 Grp. 2 Grp. 3	
	S	.78	.82	.85	.93	.89		Grp. 5	

*M=Mean; S=Standard Deviation

**Respondent groups *within* the same subset are homogeneous in their response to a questionnaire item ($p > .05$). Respondent groups *between* subsets significantly differ in their response to a questionnaire item ($p < .05$).

TABLE IIIb.

(Continued)

Statement	*	Group 1 Math Adm.	Group 2 Holt School Adm.	Group 3 Non-Holt School Adm.	Group 4 Wtd. Holt Tchrs.	Group 5 Wtd. Non-Holt Tchrs.	Multiple Comparison Conclusion** Subset 1	Subset 2	Subset 3
IN PREPARATION FOR DECIMAL SKILLS, STRESS SHOULD BE GIVEN TO FRACTIONS WITH THE DENOMINATOR OF TEN	M	3.92	3.77	3.81	3.65	3.71	Grp. 2 Grp. 4	Grp. 1 Grp. 2	
	S	.89	.80	.81	.85	.86	Grp. 5	Grp. 3	
TEACHING THE RELATION OF OPERATIONS (e.g. Subtraction of the inverse of addition) IS AN IMPORTANT OBJECTIVE OF ANY MATH PROGRAM	M	3.93	4.01	3.99	4.17	4.11	Grp. 1 Grp. 2	Grp. 2	Grp. 4
	S	.82	.74	.77	.78	.79	Grp. 3	Grp. 5	Grp. 5
THE "FUNCTION MACHINE" IS A VALUABLE TOOL IN AIDING COMPREHENSION OF MATH CONCEPTS	M	3.20	3.28	3.18	3.10	3.10	Grp. 1 Grp. 3	Grp. 1 Grp. 2	
	S	.84	.75	.72	.91	.82	Grp. 4 Grp. 5	Grp. 3	
CHILDREN SHOULD GAIN EQUAL FACILITY IN HORIZONTAL AND VERTICAL NOTATION	M	3.68	3.64	3.51	3.78	3.69	Grp. 1 Grp. 2	Grp. 1 Grp. 2	
	S	.94	.85	.87	.92	.96	Grp. 3	Grp. 4 Grp. 5	
MAINTENANCE OF SKILLS SHOULD BE PROVIDED FOR AT THE END OF EACH TEXT LESSON	M	4.03	4.28	4.23	4.45	4.43	Grp. 1	Grp. 2	Grp. 4
	S	.87	.66	.74	.66	.71		Grp. 3	Grp. 5

TABLE IIIc.

(Continued)

Statement	*	Group 1 Math Adm.	Group 2 Holt School Adm.	Group 3 Non-Holt School Adm.	Group 4 Wtd. Holt Tchrs.	Group 5 Wtd. Non-Holt Tchrs.	Multiple Comparison Conclusion** Subset 1	Subset 2	Subset 3
THE FOUR OPERATIONS SHOULD BE TAUGHT IN SEPARATE CHAPTERS	M	3.04	3.44	3.40	3.38	3.38	Grp. 1	Grp. 2 Grp. 3 Grp. 4 Grp. 5	
	S	1.01	1.03	1.00	1.18	1.15			
PLACE VALUE IS AN IMPORTANT CONCEPT IN MATH INSTRUCTION	M	4.30	4.32	4.27	4.46	4.41	Grp. 1 Grp. 2 Grp. 3	Grp. 1 Grp. 2 Grp. 5	Grp. 4 Grp. 5
	S	.84	.65	.72	.62	.70			
TEACHING MISSING ADDENDS IS AN IMPORTANT PART OF A PRIMARY MATH PROGRAM	M	3.11	3.61	3.48	3.58	3.48	Grp. 1	Grp. 2 Grp. 3 Grp. 4 Grp. 5	
	S	1.07	.86	.89	1.05	1.06			
GROUPING TO TENS HELPS PRIMARY CHILDREN LEARN BASIC FACTS WITH SUMS GREATER THAN TEN	M	3.66	3.89	3.80	3.78	3.79	Grp. 1 Grp. 3 Grp. 4 Grp. 5	Grp. 2 Grp. 3 Grp. 4 Grp. 5	
	S	.81	.73	.77	.86	.85			

E. Instructional Design and Content of the HOLT SCHOOL MATHEMATICS Program.

The school administrators and teachers employing the HSM program were asked to rate general features of the series on a scale of 5 (Excellent) to 1 (Poor). (Please refer to TABLE IV for the analysis summary on pages 15 and 16.)

All the general features were rated as "Good" (Scale Value=3) or "Very Good" (Scale Value=4) by the respondent groups with the exception of the "metric system," which received a "Fair" rating (Scale Value=2) by the "weighted" teacher total. The school administrators and the teachers tend to agree that major strengths of the program are in its presentation of basic skills, organization of contents, development of concepts, and appropriate math vocabulary.

Teachers employing the HSM program were asked to rate how strongly they agreed with specific statements concerning the program's instructional design and content on a scale of 5 (Strongly Agree) to 1 (Strongly Disagree). A One-Way Analysis of Variance and Scheffé Procedure were conducted to compare teacher groups according to their judgments. (Please refer to TABLE V for the analysis summary on page 17.)

All Holt respondents report agreement with the following statements concerning the HSM program:

1. The size of type used is right for my students.

2. The 3-part approach of the lessons (display-development-drill) is effective with my students, and

3. More measurement skills should be presented at each grade level.

The respondents report that they are undecided in regard to the statement: The measurement chapter should be introduced earlier in the text. Their responses tend to move in the direction of disagreement for the following responses:

1. Geometry skills should be integrated within each chapter.

2. There should be more geometry skills taught, and

3. The amount of exercises devoted to missing addends is excessive.

In general, teachers tend to report rather homogeneous judgments in their responses to these statements. This conclusion can be recognized from the summary chart in that teacher groups often appear within the same subset.

The teachers were asked to rate how valuable they found features in the HSM Teacher's Edition on a scale of 5 (Very Valuable) to 1 (Of Little Value). A One-Way Analysis of Variance and Scheffé Procedure were conducted to compare teacher groups according to their grade assignment. (Please refer to TABLE VI for the analysis summary on pages 18 and 19.)

The responden's report that the features in the Teacher's Edition are in the direction of "Very Valuable." More specifically, these highly rated Teacher's Edition features are:

1. Listing of chapter objectives.
2. Listing of lesson objectives.
3. Cumulative tests.
4. Extra practice references for each lesson.
5. Suggestions for utilizing other components of the program.
6. Three levels of assignments.
7. Three levels of additional activities.
8. Individualized guide.
9. Background information for each chapter and lesson.
10. Vocabulary lists for each chapter.
11. Activity reservoir, and
12. Problems of the week.

Teachers report that the following features are of "Moderate Value":

1. Teacher commentary in the front of the book, and
2. Pacing charts.

No features in the HSM Teacher's Edition were reported by teachers as being in the direction, "Of Little Value." It should be noted that junior high school teachers tend to rate features of the Teacher's Edition lower than the other teacher groups.

Similarly, the teachers were asked to rate how valuable were the features in the HSM Pupil's Edition on a scale of 5 (Very Valuable) to 1 (Of Little Value). A One-Way Analysis of Variance and Scheffé Procedure were conducted to compare teacher groups according to their grade assignment. (Please refer to TABLE VII for the analysis summary on page 20.)

The respondents report that all the features in the Pupil's Edition are in the direction of "Very Valuable." Intermediate teachers (Grades 3-6) particularly rate the features quite highly. These highly rated Pupil's Edition features are:

1. Keeping fit.
2. Check ups.
3. Chapter review.
4. Chapter test.
5. Tuning ups, and
6. Brainteasers.

TABLE IVa.

RATING OF FEATURES
FOR THE HOLT SCHOOL MATHEMATICS PROGRAM

Scale Values: 5=Excellent, 4=Very Good, 3=Good, 2=Fair, 1=Poor

Feature	*	School Administrator	Wtd. Teacher Total	Grade K-2 Teachers	Grade 3-6 Teachers	Grade 7-8 Teachers
ORGANIZATION OF CONTENTS (Topic Sequence)	M	3.63	3.47	3.21	3.65	3.45
	S	.87	1.03	1.09	1.01	.93
DEVELOPMENT OF CONCEPTS	M	3.56	3.43	3.34	3.50	3.42
	S	.85	.94	.98	.91	.93
PROBLEM SOLVING	M	3.23	3.15	3.22	3.12	3.13
	S	.92	.98	.93	.99	1.02
MATERIAL RACIALLY AND SEXUALLY BALANCED	M	3.33	3.45	3.56	3.39	3.41
	S	.79	.92	.87	.94	.92
METRIC SYSTEM	M	2.63	2.40	2.25	2.41	2.55
	S	.96	1.05	.98	1.06	1.07
PRACTICE PAGES	M	3.44	3.34	3.07	3.45	3.43
	S	.99	1.13	1.13	1.15	1.05
STUDENT EVALUATION PROVISIONS	M	3.26	3.10	2.94	3.24	3.04
	S	.76	.97	.99	.98	.89
MAINTENANCE OF SKILLS	M	3.46	3.42	3.16	3.54	3.50
	S	.89	.95	.98	.94	.89
COMPUTATIONAL SKILLS	M	3.52	3.44	3.27	3.53	3.47
	S	.89	.92	.90	.91	.93
APPROPRIATE MATH VOCABULARY	M	3.53	3.58	3.59	3.61	3.53
	S	.77	.85	.84	.84	.86
BASIC SKILLS	M	3.57	3.53	3.40	3.63	3.50
	S	.91	.96	.95	.97	.93

*M=Mean; S=Standard Deviation

TABLE IVb.

RATING OF FEATURES
FOR THE HOLT SCHOOL MATHEMATICS PROGRAM

Scale Values: 5=Excellent, 4=Very Good, 3=Good, 2=Fair, 1=Poor

Feature	*	School Administrator	Wtd. Teacher Total	Grade K-2 Teachers	Grade 3-6 Teachers	Grade 7-8 Teachers
PROVISION FOR DIFFERENT TEACHING STYLES	M	3.27	3.25	3.25	3.30	3.17
	S	.94	1.00	1.01	.99	1.00
PROVISION FOR INDIVIDUALIZATION	M	3.22	3.19	3.13	3.30	3.06
	S	1.07	1.14	1.12	1.14	1.16
ACTIVITY ORIENTED	M	2.99	2.93	3.10	2.96	2.70
	S	.88	1.02	1.00	1.01	1.01
DIAGRAMS AND PICTURES AID CONCEPT DEVELOPMENT	M	3.38	3.32	3.53	3.34	3.05
	S	.86	.98	.99	.99	.89
DIAGRAMS AND PICTURES ARE GEARED TO STUDENT MATURITY LEVEL	M	3.40	3.46	3.68	3.47	3.19
	S	.86	.96	.95	.96	.92

*Mean=Mean; S=Standard Deviation.

TABLE V.

One-Way Analysis of Variance and Scheffé Procedure Summary for: The Instructional Design and Content of the HOLT SCHOOL MATHEMATICS Series

Q. How strongly do you agree or disagree with each of the following statements concerning the Holt MATHEMATICS series? (Scale Values: 5=Strongly Agree, 4=Agree, 3=Undecided, 2=Disgree, 1=Strongly Disagree.)

Statement	*	Holt Teachers (Grades Taught)			Multiple Comparison Conclusion**	
		K-2	3-6	7-8	Subset 1	Subset 2
GEOMETRY SKILLS SHOULD BE INTEGRATED WITHIN EACH CHAPTER	M S	2.63 .87	2.48 .92	2.58 .93	3-6 7-8	K-2 7-8
MORE MEASUREMENT SKILLS SHOULD BE PRESENTED AT EACH GRADE LEVEL	M S	3.47 .95	3.76 .87	3.73 .81	K-2	3-6 7-8
THE 3-PART APPROACH OF THE LESSONS (DISPLAY-DEVELOPMENT-DRILL) IS EFFECTIVE WITH MY STUDENTS	M S	3.91 .71	4.07 .73	3.92 .74	K-2 7-8	3-6
THE MEASUREMENT CHAPTER SHOULD BE INTRODUCED EARLIER IN THE TEXT	M S	2.89 .93	3.22 .99	3.26 .88	K-2	3-6 7-8
THERE SHOULD BE MORE GEOMETRY SKILLS TAUGHT	M S	2.72 .88	2.65 .93	2.77 .84	K-2 3-6 7-8	
THE SIZE OF TYPE USED IS RIGHT FOR MY STUDENTS	M S	4.05 .62	4.09 .66	4.03 .60	K-2 3-6 7-8	
THE AMOUNT OF EXERCISES DEVOTED TO MISSING ADDENDS IS EXCESSIVE	M S	2.89 1.09	2.74 .82	2.78 .67	3-6 7-8	K-2 7-8

*Mean=Mean; S=Standard Deviation

**Teacher groups *within* the same subset are homogeneous in their response to a questionnaire item ($p > .05$).
Teacher groups *between* subsets significantly differ in their response to a questionnaire item ($p < .05$).

TABLE VIa.

One-Way Analysis of Variance and Scheffé Procedure Summary for: The Instructional Design and Content of the HOLT SCHOOL MATHEMATICS Series

Q. Which features in Holt MATHEMATICS Teacher's Edition do you find valuable? (Scale Values: 5=Very Valuable, 3=Of Moderate Value, 1=Of Little Value.)

Features of the Teacher's Edition	*	Holt Teachers (Grades Taught)			Multiple Comparison Conclusion**	
		K-2	3-6	7-8	Subset 1	Subset 2
TEACHER COMMENTARY IN THE FRONT OF THE BOOK	M	3.34	3.27	3.21	K-2	
	S	1.08	1.08	1.14	3-6	
					7-8	
LISTING OF CHAPTER OBJECTIVES	M	4.00	3.89	3.69	7-8	K-2
	S	.92	.96	1.07		3-6
LISTING OF LESSON OBJECTIVES	M	4.13	4.02	3.76	7-8	K-2
	S	.92	.94	1.08		3-6
CUMULATIVE TESTS	M	4.02	4.24	3.84	K-2	3-6
	S	1.02	.92	1.07	7-8	
EXTRA PRACTICE REFERENCES FOR EACH LESSON	M	4.31	4.53	4.21	K-2	3-6
	S	.87	.73	.87	7-8	
SUGGESTIONS FOR UTILIZING OTHER COMPONENTS OF THE PROGRAM	M	3.52	3.58	3.35	7-8	K-2
	S	.94	.90	.99		3-6
PACING CHARTS	M	2.96	3.10	2.82	K-2	K-2
	S	1.05	1.06	1.11	7-8	3-6
THREE LEVELS OF ASSIGNMENTS	M	3.52	3.65	3.38	K-2	K-2
	S	1.07	1.02	1.17	7-8	3-6
THREE LEVELS OF ADDITIONAL ACTIVITIES	M	3.66	3.71	3.39	7-8	K-2
	S	1.02	.97	1.08		3-6

*Mean=Mean; S=Standard Deviation.

**Respondent groups *within* the same subset are homogeneous in their response to a questionnaire item ($p>.05$).

Respondent groups *between* subsets significantly differ in their response to a questionnaire item ($p<.05$).

TABLE VIb.

(Continued)

Features of the Teacher's Edition	*	Holt Teachers (Grades Taught)			Multiple Comparison Conclusion**	
		K-2	3-6	7-8	Subset 1	Subset 2
INDIVIDUALIZED GUIDE	M	3.48	3.56	3.03	7-8	K-2
	S	1.07	1.06	1.15		3-6
BACKGROUND INFORMATION FOR EACH CHAPTER AND LESSON	M	3.71	3.65	3.41	7-8	K-2
	S	.93	.99	1.04		3-6
VOCABULARY LISTS FOR EACH CHAPTER	M	3.61	3.67	3.52	K-2	
	S	1.02	1.03	1.07	3-6	
					7-8	
ACTIVITY RESERVIOR	M	3.88	3.83	3.42	7-8	K-2
	S	.89	.94	1.00		3-6
PROBLEMS OF THE WEEK	M	3.48	3.57	3.33	K-2	K-2
	S	.96	1.01	1.06	7-8	3-6

TABLE VII.

One-Way Analysis of Variance and Scheffe Procedure Summary for: The Instructional Design and Content of the HOLT SCHOOL MATHEMATICS Series

Q. Which special features in Holt MATHEMATICS Pupil's Edition do you find valuable? (Scale Values: 5=Very Valuable, 3=Of Moderate Value, 1=Of Little Value.)

Features of the Pupil's Edition	*	Holt Teachers (Grades Taught)			Multiple Comparison Conclusion**	
		K-2	3-6	7-8	Subset 1	Subset 2
BRAINTEASERS	M	3.54	3.44	3.54	K-2	
	S	.99	1.07	.96	3-6	
					7-8	
KEEPING FIT	M	3.97	4.51	3.94	K-2	3-6
	S	.88	.75	.92	7-8	
CHECK UPS	M	4.29	4.56	4.14	K-2	3-6
	S	.78	.66	.84	7-8	
CHAPTER REVIEW	M	4.36	4.65	4.43	K-2	3-6
	S	.79	.65	.74	7-8	
CHAPTER TEST	M	4.23	4.55	4.15	K-2	3-6
	S	.93	.80	.98	7-8	
TUNING UPS	M	3.89	4.09	4.18	K-2	3-6
	S	.85	.91	.88		7-8

*M=Mean; S=Standard Deviation.

**Respondent groups *within* the same subset are homogeneous in their response to a questionnaire item ($p>.05$).

Respondent groups *between* subsets significantly differ in their response to a questionnaire item ($p<.05$).

IV. DISCUSSION:

The HOLT SCHOOL MATHEMATICS Study appears to have met its proposed objectives in that it has assessed:

A. The characteristics of the population samples completing the questionnaire.

The respondents are from geographic regions throughout the United States as well as from various types of school communities. Teachers (both Holt and non-Holt) report teaching at their current grade assignment for approximately eight years. They commonly spend 201–250 minutes per week on mathematics instruction and group students for mathematics instruction as a whole class (regardless of grade assignment level). In addition, teachers typically classify their students as on grade level in mathematics.

B. Judgments from educators as to the trends in the mathematics curriculum of five years hence.

In general, school administrators and teachers report that the following trends in mathematics curriculum will be *maintained* at their current 1976–1977 level: computation with large numbers, number properties, probability, geometry, related sentences, inequalities, expanded notation, scientific notation and fractions. They report an *increase* in curriculum emphasis for basic skills, metric system, use of the mini-calculator, estimation skills, readiness activities, problem solving, use of manipulative materials, drill, decimal computation, percents, and student projects. They report a *decrease* in curriculum emphasis for sets and numeration systems other than base ten.

An analysis of variance and Scheffé procedure concluded that there were no significant differences ($p < .05$) between Holt and non-Holt school administrators and teachers in their judgments for future trends in mathematics. This report finding suggests that the judgments of Holt-users and non-users, in regard to trends in mathematics curriculum, tend to be homogeneous.

C. Judgments from educators as to features which are considered important in selecting a mathematics series.

The most important feature in selecting a mathematics series for all respondents is "Stress on Basic Skills." It is interesting to note that school administrators (Holt and non-Holt) agree in their second feature selection—"Practical Applications" and that teachers (Holt and non-Holt) agree in their second feature selection—"Practice Exercises."

D. Judgments from educators as to general mathematics curriculum statements.

An analysis of variance and Scheffé procedure concluded that there were no significant differences ($p < .05$) between the judgments of Holt and non-Holt school administrators in regard to general mathematics curriculum statements. Typically, there were no significant differences between the judgments of Holt and non-Holt teachers. There were however, often significant differences

between the judgments of school administrators (total) and teachers (total). Notably, the responses tend to move in the direction of disagreement to the statement: Instruction in using a mini-calculator should be included as a regular aspect of a *pupil* text. The variance of the responses for this statement, however, are very large, indicating strongly differing judgments within respondent groups.

E. Judgments from educators employing the HSM program concerning the instructional design and content of the program.

Teachers rate only two features of the Teacher's Edition (i.e. the teacher commentary and the pacing charts) as being of "moderate value;" all other features of the Teacher's Edition are rated in the direction of "very valuable." Moreover, Holt teachers report that all the features in the Pupil's Edition are in the direction of "very valuable."

The Holt respondents agree that the "Display-Development-Drill" approach of the HSM lessons is quite effective with their students. The respondents' ratings of the general features in the HSM program are valued as "Good" to "Very Good." One of its highest rated features is its "presentation of basic skills," the most important feature according to all respondents, in selecting a mathematics series.

V. Implications of the Study for HSM Program Development.

A. School administrators and teachers are very supportive of the Display-Development-Drill approach of the HSM lessons as well as the program's presentation of basic skills. (These program strengths have been maintained in the 1978 edition of the HOLT SCHOOL MATHEMATICS program.)

B. Teachers report that all of the features of both the Teachers' Edition and the Pupil's Edition are quite valuable in their instruction. (These features have been maintained in the 1978 edition of the HOLT SCHOOL MATHEMATICS program.)

C. School administrators and teachers report various trends in the mathematics curriculum which reinforce the program development of the 1978 edition of HOLT SCHOOL MATHEMATICS program namely:

1. Lessons with sets have been deemphasized in grades 3 through 8.
2. Although exercises are still provided in this area, lessons with numeration systems other than base ten are optional in grades 3 through 8.
3. Metric and estimation exercises have been included in the program, as well as mini-calculator activities in the teacher's edition.
4. Student career activities and general activities as distinct features have been introduced in the program. In addition, the 1978 edition of the HSM includes student activity *lessons*.

D. The design of the research to be conducted for the nationwide HOLT SCHOOL MATHEMATICS Field Study (1977–1978) has been refined as the result of this present evaluation. The survey measures of the HSM Field Study will be directed only to school administrators, teachers, and students (Grades 1–8) who are employing the 1978 edition of the HSM program. Moreover, the impact of the HSM program on student achievement in mathematics will be assessed, in part, by pre and post administrations of the *Diagnostic Mathematics Inventory* © 1975, a criterion-referenced test published by the California Testing Bureau/McGraw-Hill.